

Amendments to the Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A machining method for positioning a work and a tool in directions of X-, Y- and Z-axes perpendicular to one another and machining said work, comprising the steps of:

~~moving said work in each of said X- and Y- axis directions relative to said Z-axis corresponding to an axis of said tool, prior to machining;~~

~~examining obtaining positioning response properties of said X- and Y- axis directions with respect to said Z- axis data until stabilizing a position deviation within a predetermined allowable range from a command-reach time after moving said work in each of said X- and Y- axis directions relative to said Z-axis corresponding to an axis of said tool, prior to machining; and~~

~~determining a lowering timing of movement of positioning said tool in said Z-axis direction based on said obtained ~~data of said~~ positioning response properties data.~~

2. (Currently Amended) A machining method according to Claim 1, wherein a plurality of ~~measuring conditions for confirming said positioning response properties are established in advance~~ examination conditions for

movement in said X- and Y-axis directions for obtaining said positioning response data are predetermined.

3. (Currently Amended) A machining method according to Claim 2, wherein said ~~measuring~~ examination conditions clarify the dependence of at least one of a movement start point, a movement direction, a movement velocity, a movement acceleration and a movement distance.

4. (Currently Amended) A machining method according to Claim 2, wherein said positioning response ~~properties~~ data to be used during machining are selected from said obtained positioning response data in comparison between movement conditions to be used during machining and said ~~measuring~~ predetermined examination conditions.

5. (Currently Amended) A machining method according to Claim 1, wherein control parameters for movement in said X- and Y-axis directions that can change said positioning response properties are prepared in advance, ~~said control parameters are changed when said obtained data is out of a predetermined range, said positioning response properties are examined, and said tool is positioned in said z-axis direction based on said control parameters with which said obtained data is within said range and such control parameters that said obtained positioning response data are within a predetermined range are used, or if said obtained positioning response data are not with said predetermined range, obtaining positioning response data is repeated by~~

changing said control parameters until said obtained positioning response data are within said predetermined range.

6. (Currently Amended) A machining method according to Claim 1, wherein at least one of a movement start time, a movement velocity and a movement start position with which said tool moves in said Z-axis direction is controlled based on said obtained positioning response ~~properties~~ data.

7. (Currently Amended) A machining method according to Claim 6, wherein said movement start position is ~~established~~ set to be shorter than a predetermined air-cut distance by a distance L_c obtained from an equation:

$$L_c = V_z(T_a - T_s)$$

using ~~a difference T_e between~~ movement time T_a and stabilization time T_s and a lowering velocity V_z .

8. (Currently Amended) A machining method according to Claim 1, wherein an allowable range of stabilization is ~~established~~ set in accordance with machining accuracy, and said positioning response ~~properties~~ data in each of said X- and Y-axis directions with respect to said Z-axis are examined in said ~~established~~ allowable range of stabilization.

9. (Currently Amended) A machining method for positioning a work and a tool in directions of X-, Y- and Z-axes perpendicular to one another and machining said work, comprising the steps of:

setting an axis of said tool as said Z-axis, and obtaining a delay of Z-axis position response of a main shaft holding said tool, prior to machining; and

setting a movement start time ~~in~~ for said X- and Y-axes at a time point when time obtained by adding said delay of Z-axis position response of said main shaft to a command time required for from a forward end of said tool inside said work ~~to lift back~~ to a surface of said work has passed ~~since~~ from a time point when said forward end of said tool reached a cutting distance.

10. (Original) A machining method according to any one of Claims 1 to 9, wherein said tool is a drill.

11. (Original) A processing method according to any one of Claims 1 to 9, wherein said work is a printed wiring board.

12. (Currently Amended) A machining apparatus comprising:
moving means for moving a table and a main shaft relatively to each other in directions of X-, Y- and Z-axes perpendicular to one another, said table being mounted with a work, said main shaft holding a tool, said moving means being operated to machine said work;

drive means for moving said work in each of said X-axis direction and said Y-axis direction relatively to said Z-axis corresponding to an axis of said tool, prior to machining;

response property detecting means for ~~examining~~ obtaining positioning response ~~properties~~ data until stabilizing a position deviation within a predetermined allowable range from a command-reach time after moving said work in each of said X- and Y-axis directions with respect to said Z-axis corresponding to an axis of said tool, prior to machining; and

positioning control means for ~~positioning~~ determining a lowering timing of movement of said tool in said Z-axis direction based on said obtained ~~data for~~ said positioning response ~~properties~~ data.

13. (Currently Amended) A machining apparatus comprising:

moving means for moving a table and a main shaft relatively to each other in directions of X-, Y- and Z-axes perpendicular to one another, said table being mounted with a work, said main shaft holding a tool, said moving means being operated to machine said work;

program storage means for storing examination programs and machining programs;

analyzing means for reading said machining programs from said storage means and analyzing said ~~read~~ programs;

pattern storage means for storing a pattern and a stabilization time of predetermined moving operation;

pattern matching judging means for judging matching between moving operation analyzed by said analyzing means and said moving operation stored in said pattern storage means;

drive control means for moving said work and/or said tool in said X- and Y-axis directions;

command creating means for creating a Z-axis lowering command to said drive control means; and

response analyzing means for analyzing position response of said work and/or said tool in each of said axes driven by said drive control means;

wherein prior to machining, said table and said tool are moved in two directions perpendicular to said Z-axis corresponding to said main shaft under specified ~~measuring~~ examination conditions, a stabilization time required until position response of said moving means reaches and stays within a predetermined allowable range is obtained after a command-reach time of a positioning command, and at the time of machining, said tool is moved in said Z-axis direction based on said obtained stabilization time.

14. (Original) A machining apparatus according to Claim 12 or 13, further comprising:

parameter storage means for storing a set of predetermined control parameters;

wherein said drive control means acquires said control parameters from said parameter storage means, and moves said work and/or said tool in said X-axis direction and said Y-axis direction based on said control parameters.

15. (Previously Presented) A machining apparatus according to Claim 13, further comprising control means for examining positioning response properties with respect to said X- and Y-axis directions at a time of shipment, storing said stabilization time obtained thus into said pattern storage means, and comparing said stored stabilization time with a stabilization time examined after installation, so as to judge installation conditions.

16. (Original) A machining apparatus according to Claim 15, wherein said control means concludes that there is a trouble in a specific position of a base supporting said apparatus when said stabilization time varies widely in accordance with a coordinate value of a movement start point examined after installation.

17. (Original) A machining apparatus according to Claim 16, wherein said control means judges swinging of said apparatus based on magnitude of overshoot/undershoot of a response waveform and said stabilization time examined after installation, so as to estimate installation conditions and/or floor rigidity.

18. (Previously Presented) A machining apparatus according to Claim 12 or 13, wherein said tool is a drill.

19. (Previously Presented) A machining apparatus according to Claim 12 or 13, wherein said work is a printed wiring board.